01 22 38 22	CC	Apollo 8, Houston. Go.
01 22 38 27	CMP	It might be interesting to note that after NAV sightings, we ran out P21, and we get a pericynthian now of 66.8 miles.
01 22 38 38	CC	Roger, 8. We copy.
01 22 38 45	LMP	I knew if he did it long enough, he'd finally get one that was close.
01 22 39 13	LMP	Okay. Start fuel cell 2.
01 22 39 18	CC	Roger.
01 22 39 54	CC	Apollo 8, Houston. Your state vector update is complete and verified. You can have the computer back in BLOCK. Over.
01 22 40 05	CMP	Roger.
01 22 41 20	LMP	Okay. Going to number 1, O_2.
01 22 41 25	CC	Roger, Bill.
01 22 41 28	LMP	Old Helmut Kuehnel's kitchen timer is pretty nice.
01 22 41 58	CC	Roger, Bill. You can turn off your H_2 heaters now.
01 22 42 06	CMP	Wilco.
01 22 43 01	CC	Bill, we show you 168 000 out, and we're getting - still getting pretty good high bit rate off the 30-foot dishes.
01 22 43 13	LMP	Okay. I'm in NARROW BEAM high gain now. Were you getting good high bit rate on the OMNI?
01 22 43 26	CC	That's affirmative. We're back on high gain now.

01 22 43 39	LMP	Okay. Number 1 O_2 is off, and will you clarify your previous statement. Were you getting good high bit rate while we were on the OMNI's about 10 minutes ago? Over.
01 22 43 50	CC	Apollo 8, Houston. That's affirmative. We were getting fairly good high bit rate with a little bit of noise.
01 22 43 59	LMP	Okay. Thank you.
01 22 44 02	CC	Roger. We only got two things left to do now. We need your crew status report and a redundant component check.
01 22 44 13	LMP	Okay. Jim will give you the latter - former, and I'll give you the latter.
01 22 44 20	CC	Okay.
01 22 44 42	CC	Bill, EECOM says thanks for the good job of keeping the OMNI's moving.
01 22 44 54	LMP	Roger. We'll make any sacrifice as long as they keep an eye on the systems.
01 22 45 03	CC	Wilco.
01 22 45 10	LMP	Who's on the watch with you?
01 22 45 15	CC	It's just me right now.
01 22 45 20	LMP	How about EECOM?
01 22 45 22	CC	Well, we have Clint. The Black Watch is watching.
01 22 45 32	LMP	Okay. Stay alert.
01 22 45 34	CC	Roger. The Black Watch is watching.
01 22 45 35	LMP	Roger. I'll stay alert.

01 22 48 50	CMP	I wouldn't be a bit surprised.
01 22 48 56	LMP	Houston, we're showing a glycol EVAP OUT TEMP around 44, and a RAD OUT TEMP of about 28. I wonder if we might try some manual mixing here to raise the glycol EVAP TEMP OUT a little bit?
01 22 49 26	CC	Roger, Bill. Stand by.
01 22 54 15	LMP	Okay. Houston, secondary loop is coming up.
01 22 54 19	CC	Roger, Bill.
01 22 55 16	LMP	Okay. We're boiling the secondary EVAP, and the temperature's stabilized, and so we're gonna close up the EVAP pressure valve.
01 22 55 25	CC	Roger. Copy.
01 22 56 33	CC	Apollo 8, Houston.
01 22 56 37	LMP	Go ahead, Houston.
01 22 56 39	CC	Roger, Bill. Before you try the manual mixing, we'd like you to give it a whirl at the manual and increase on the cabin TEMP. Over.
01 22 56 52	LMP	We've done that. We're in full HOT, and what is your - what's the lowest RAD OUT - individual RAD OUT TEMP you seen here during our PTC?
01 22 57 10	CC	Roger. Stand by.
01 22 57 36	CC	Apollo 8, this is Houston. We saw 26 one time.
01 22 57 45	LMP	Roger. Understand; plus 26.
01 22 57 50	CC	Affirmative.
01 22 58 22	CC	Apollo 8, Houston. Go ahead with your manual mixing. Suggest you set your EVAP OUT at about 55. Over.

01 22 58 33	LMP	Okay. We'll give that a try, and let us know if the RAD OUT TEMP's get too low.
01 22 58 38	CC	Roger. We're monitoring.
01 23 10 18	LMP	Houston, Apollo 8.
01 23 10 21	CC	Apollo 8, Houston. Go.
01 23 10 26	LMP	Roger. We have it stabilized about 53 degrees, and we will leave it there, but we will go back AUTO if you start having any concern about the radiators.
01 23 10 39	CC	Roger, Bill. We are showing 51.4 here.
01 23 10 46	LMP	Okay.
01 23 23 00	CC	Apollo 8, this is Houston. We are going to have a command changeover to Honeysuckle in about 2 minutes. Over.
01 23 23 08	CMP	Roger, Houston. Standing by.
01 23 23 13	CC	Apollo 8, Houston. That was Honeysuckle to Madrid.
01 23 23 21	CMP	Si, senor.
01 23 23 27	LMP	Goodby, you chaps.
01 23 24 34	CMP	Houston, Apollo 8.
01 23 24 36	CC	Apollo 8, Houston. Go.
01 23 24 40	CMP	Roger. Did you delete the cislunar NAV exercise at 47:15?
01 23 24 46	CC	That's affirmative, and we added the extra star sightings to the one at 45.
01 23 27 43	LMP	Houston, Apollo 8. How do you read?
01 23 27 48	CC	Apollo 8, this is Houston. Buenas dias, muchachos.

01 23 27 53	LMP	Buenas dias. We're going to be answering your calls pretty quietly for a little while here to let the CDR get to sleep. If you can't hear us, why, just tell us so.
01 23 28 09	CC	Okay.

END OF TAPE

APOLLO 8 AIR-TO-GROUND VOICE TRANSCRIPTION

(GOSS NET 1)

01 23 33 07	LMP	Houston, Apollo 8.
01 23 33 10	CC	Apollo 8, Houston. Go.
01 23 33 19	CC	Apollo 8, Houston. Go.
01 23 33 24	LMP	Roger. My two cohorts are going to try and get some sleep here, so y'all might keep a good eye on the systems. I'm going to move over to the other side.
01 23 33 35	CC	Roger.
01 23 34 24	CC	Apollo 8, Houston. We're getting low bit rate now. We could do better with a high-gain antenna before you move over to the other side. Over.
01 23 34 36	LMP	Roger.
01 23 40 49	LMP	Houston, Apollo 8.
01 23 40 52	CC	Apollo 8, Houston. Go.
01 23 40 57	LMP	You might give me a call every now and then, Jerry, just to let me know you're still there, as we're switching antennas, or play some music or something.
01 23 41 10	CC	Say again, Bill. You're kind of garbled.
01 23 41 15	LMP	I say you might just give me a call every now and then as we switch antennas, just to let me know you're still there, or play some music or something, just to make sure we haven't lost COMM.
01 23 41 29	CC	Okay, Bill. Your antennas are looking good now.
01 23 42 03	CC	Hey, Bill. If you want music, I'll have Mike sing.

01 23 42 11	LMP	Ask him to sing "Anchors Aweigh", will you?
02 00 07 45	CC	Apollo 8, Houston.
02 00 07 51	LMP	Roger.
02 00 07 53	CC	On your secondary coolant loop, looks like your back-pressure valve might be slightly open. I suggest you go to secondary coolant loop EVAP switch to the RESET position for 58 seconds. Over.
02 00 08 12	LMP	Roger. I did that again; I'll try it a third time.
02 00 08 14	CC	Okay.
02 00 10 04	LMP	That didn't do it any good, Houston.
02 00 10 07	CC	Roger, Bill.
02 00 10 18	LMP	Keep an eye on it, in case it starts dropping. It stabilized there right after I shut the evaporator off.
02 00 10 24	CC	Roger. We will watch it.
02 00 11 06	LMP	What might have happened, Jim might have gotten the water control valve off before we completely had the back-pressure valve closed.
02 00 11 20	CC	Roger. Understand Jim turned the water control valve off.
02 00 11 28	LMP	Roger. We have the secondary water EVAP control valve off, but he might have gotten it off on that return pump chart check prior to the time the evaporator back-pressure valve had completely

		closed, which might explain its lower-than-nominal state pressure.
02 00 11 46	CC	Roger. Understand.
02 00 30 17	CC	Apollo 8, Houston. Over.
02 00 30 23	LMP	Go ahead.
02 00 30 24	CC	Roger, Bill. We see your secondary steam pressure coming back up slowly, and we would like to just sit and watch it for a while before doing anything else.
02 00 30 36	LMP	Okay.

END OF TAPE

APOLLO 8 AIR-TO-GROUND VOICE TRANSCRIPTION

(GOSS NET 1)

02 01 16 34	CC	Apollo 8, Houston.
02 01 17 07	CC	Apollo 8, this is Houston. Over.
02 01 17 13	LMP	Go ahead, Houston. Apollo 8.
02 01 17 15	CC	Roger. I just wanted to let you know we still have voice contact, and we have the morning news for you. We can give it to you now or some time later, your choice.
02 01 17 27	LMP	How about right now?
02 01 17 29	CC	Very good. This is the 23rd of December edition of the Interstellar Times a la Paul Haney. We would like to let you know that there are only 2 more shopping days until Christmas. He says your TV transmission was a real big hit yesterday. Mickey Herskowitz is doing double duty for the Post. He's written a couple of columns on your launch in addition to his other sports columns, and, Jim, your mom certainly appreciated that birthday greeting. Twenty-one convicts broke out of a prison in New Orleans yesterday, and President Johnson went home last night from Bethesda Naval Hospital after his bout with the flu. He sends you guys a special message - not what to do for the flu - but congratulations on the flight. Are you reading me so far okay?
02 01 18 25	LMP	You're very clear, Mike.
02 01 18 27	CC	Good. Well, we had a big blizzard down here in the midwest; I don't know if you can see that from

up there or not. And in Houston, as a matter of fact, it's getting pretty chilly, about 35 degrees. And we would like to know who you like next Sunday, Baltimore of Cleveland? Baltimore defense looked pretty tremendous yesterday. They put on a great pass rush, and it sounds to CAP COMM like Haney is trying to con you guys into a bet. Over.

02 01 17 57	LMP	I like Baltimore.
02 01 19 01	CC	Are you giving points?
02 01 19 05	LMP	Negative. I don't bet.
02 01 19 09	CC	I guess you don't if you don't give points.
02 01 19 14	LMP	Now with you anyway.
02 01 19 19	CC	Okay. That's about the size of the news. Houston, standing by.
02 01 19 24	CDR	How are the families doing, Mike?
02 01 19 29	CC	They are doing just great, Bill; just talking to Valerie a few minutes ago.
02 01 19 37	CDR	That was Frank.
02 01 19 40	CC	Oh, well, likewise with Susan. I have not talked to her since last night.
02 01 19 48	CDR	Roger.
02 01 21 16	CDR	Mike, this is Frank again. Would you tell the doctors I got about 5 hours of good sleep yesterday?
02 01 21 21	CC	Roger. Thank you, Frank; we were wondering about that, about 5 hours of good sleep.

02 01 21 29	CDR	Right.
02 01 21 37	CC	How is everything going up there, Frank; all three of you guys feeling okay this morning?
02 01 21 43	CDR	Feel fine. Jim went back to sleep. Bill and I are having breakfast and everything seems fine.
02 01 21 48	CC	Good; glad to hear it.
02 02 07 18	CC	Apollo 8, Houston. Over.
02 02 07 23	CDR	Go ahead, Houston.
02 02 07 24	CC	Just checking in with you after about a 45-minute quiet break. Say, we notice on your high-gain antenna, if you like, you can get a little bit more use out of it by switching to it from OMNI when you have a yaw angle of 90 degrees and a pitch angle of minus 45 degrees. We are noticing that you are staying an extra 10 minutes on the OMNI, which is fine; but you could get more use out of the high gain if you use that procedure. Over.
02 02 08 00	CDR	Okay, thank you. It's a lot simpler for us, as long as the OMNI isn't working. We've got it all wrapped up here on the eight ball with the roll ... pointing to an OMNI number. We just switch it; it makes it a lot easier, if it is not bothering you.
02 02 08 13	CC	Okay. That is fine. We are presently happy with the COMM, Frank. We are just trying to be helpful.

02 02 08 25	CDR	Thank you very much. It's unusual that Mike Collins tries to be helpful, but nevertheless, thank you very much.
02 02 08 30	CC	Good; aerospace first, Frank.
02 02 08 35	CDR	Say hello to Howard Tindall for us, will you? His procedure seemed to be working.
02 02 08 39	CC	Sure will.
02 02 08 59	CDR	I hope that you have got everybody looking this thing over very carefully. One thing we want is a perfect spacecraft before we consider the LOI burn.
02 02 09 07	CC	Apollo 8, Houston. We concur, and we are doing that.
02 02 09 13	CDR	Okay.
02 02 09 55	CDR	Houston, Apollo 8. The water is in the process of being chlorinated at this time.
02 02 09 59	CC	Roger. Understand you're chlorinating the water at this time.
02 02 10 06	CDR	Roger.
02 02 10 48	CC	Apollo 8, Houston. Over.
02 02 10 53	CDR	Go ahead.
02 02 10 54	CC	At your convenience, we would like the readout of your service module RCS propellant quantities. We haven't gotten one of those so far this flight.
02 02 11 04	CDR	Alright. Stand by. We are just about to - need to change the antenna. I'll give them to you.

02 02 12 14	CDR	Houston, Apollo 8. How do you read?
02 02 12 18	CC	Go ahead, Apollo 8.
02 02 12 25	CDR	Okay. A, service module A, you ready?
02 02 12 30	CC	Ready to copy.
02 02 12 34	CDR	The temperature is about 111, the helium pressure - Do you just want the quantity, or do you want the whole works?
02 02 12 41	CC	Well, if you are reading, give us the whole works.
02 02 12 46	CDR	Okay. The helium pressure is about 37, the manifold is 182, and the quantity is reading 80. B has got the temperature about 112, the helium pressure about 36.5, the fuel pressure 180, and the quantity about 77. C has got the temperature of 140 - incidentally, those other temperatures should have been 120 instead of 110; I was looking at the wrong calibration here. The pressure is 37, the manifold pressure is about 182, and the quantity is 80. Temperature on D is 115, pressure is 37, the manifold pressure is 181, and the quantity is about 83.
02 02 14 02	CC	Roger, Frank. I read you loud and clear. On the temperatures, quad A and B should both the 120. Roger.
02 02 14 11	CDR	Roger.
02 02 14 12	CC	Thank you.

02 02 14 36	CDR	I will trade all of that good information for a readout of the actual quantities. If you will give us a minute, we will go ahead and plot them up, Mike.
02 02 14 45	CC	Roger. We will stand by until we get them for you.
02 02 16 34	CC	Apollo 8, Houston. I have your service module RCS quantities available. Over.
02 02 16 43	CDR	Roger. We are ready to copy at 50 hours 16 minutes.
02 02 16 47	CC	Okay. I have them both in percent and pounds; I'll give you both numbers. The pounds are slightly more accurate for plotting on your chart. Quad A 72 percent, 219 pounds; quad B 76 percent, 233 pounds; quad C 70 - -
02 02 17 10	CDR	Take it a little slower, Mike; whoa, whoa, whoa whoa.
02 02 17 13	CC	Okay.
02 02 17 15	CDR	Slow up. We just got quad A plotted. They are on separate charts.
02 02 17 20	CC	Okay.
02 02 17 22	CDR	Okay for quad B.
02 02 17 24	CC	Quad B 76 percent, 233 pounds.
02 02 17 34	CDR	Okay. Quad C.
02 02 17 36	CC	Seventy-six percent, 231 pounds.
02 02 17 49	CDR	Quad D.
02 02 17 50	CC	Seventy-six percent, 229 pounds.

02 02 17 59	CDR	Okay.
02 02 18 15	CDR	Would you give us the O_2 and H_2 as long as we are plotting?
02 02 18 18	CC	Roger. Stand by for O_2 and H_2.
02 02 19 58	CC	Apollo 8, Houston. We have got those numbers in a percent. We are going to switch them over to pounds, and in the meantime, we are going to be changing our ground antenna in about another 2-1/2 minutes. You can expect a COMM glitch. Over.
02 02 20 14	CDR	Thank you.
02 02 23 44	CC	Apollo 8, Houston. Over.
02 02 23 52	CDR	Go ahead, Houston. Apollo 8.
02 02 23 55	CC	Roger. I have your oxygen and hydrogen quantities when you are ready to copy.
02 02 24 02	CDR	Ready.
02 02 24 06	CC	Oxygen tank number 1 270 pounds, 270; oxygen tank 2 267, 267 pounds. Over.
02 02 24 24	CDR	Roger. Thank you.
02 02 24 26	CC	Roger. On the hydrogen, hydrogen tank 1 19.7; hydrogen tank 2 20.1. Over.
02 02 24 41	CDR	Understand; 19.7 and 20.1.
02 02 24 44	CC	Roger. You are a little bit low on the line on your graph due to the fact that they started out low.
02 02 24 55	CDR	Roger.

END OF TAPE

APOLLO 8 AIR-TO-GROUND VOICE TRANSCRIPTION

(GOSS NET 1)

02 02 54 46	CDR	Houston, how do you read? Apollo 8.
02 02 54 48	CC	Apollo 8, Houston. Loud and clear. How me? Over.
02 02 54 54	CDR	Loud and clear. I was just checking. Over.
02 02 54 57	CC	Roger.
02 02 56 09	CC	Apollo 8, Houston. Over.
02 02 56 13	CDR	Go ahead.
02 02 56 15	CC	Roger, Frank. Your 51-hour update of block data will be omitted. The block data you have on board is satisfactory. Over.
02 02 56 28	CDR	Understand. The block data we have aboard is satisfactory.
02 02 56 30	CC	Right. That's for the flyby and pericynthian plus 2 hour block update. We would like also to get a current up-to-date report on all your windows. We are trying to make some alternate plans for using the center hatch window when you are in lunar orbit, and we would like to make sure we understand exactly what the condition of all five windows is. Over.
02 02 56 54	CDR	Okay. Number - window number 1 and number 5 are clouded, but they may be partially useful. The hatch window is very badly clouded. Windows number 2 and 4 are good.
02 02 57 06	CC	Okay. Understand the hatch window is unusable, 1 and 5 are partially usable, and the rendezvous windows are both good.

02 02 57 17	CDR	Right.
02 02 57 18	CC	Okay.
02 03 13 13	CC	Apollo 8, Houston. Over.
02 03 13 18	CDR	Go ahead, Houston. Apollo 8.
02 03 13 20	CC	Roger, Frank. We would like to ask you about the next few hours in the flight plan. We are inclined to let Jim go ahead and sleep and to slip the P23 that occurs at 52:15. On the other hand, we would think it would probably be a good idea if he returned more to the normal sleep rest cycle; and if you got him up nominally to do the 52:15 work, then perhaps he would be ready to go back to sleep at about 61 hours, when he nominally is expected to do so.
02 03 13 55	CDR	Okay. He's up now, eating. We are planning to go to normal procedures on the flight plan.
02 03 14 02	CC	Okay. That - that's fine then. If - you know, there is no - it's not time critical that P23 be done at 52:15, but if you get up to do it then, that's just fine.
02 03 14 16	CDR	Well, we thought we might give it a try.
02 03 14 18	CC	Roger.
02 03 14 23	CDR	This sleep cycle here is - we're just going to have to real tire it, I guess. I'm supposed to be asleep right now but, obviously - or I'm supposed to go to sleep here shortly, but I just got up. We are going to have to play this by ear.

02 03 14 39	CC	Roger. Understand.
02 03 17 39	CDR	Houston, Apollo 8.
02 03 17 41	CC	Go ahead, Apollo 8.
02 03 17 46	CDR	Are the stars in the flight plan proper for this next exercise of P23?
02 03 17 52	CC	We would like to talk to Jim about it when he is ready to copy.
02 03 17 59	CDR	He's ready.
02 03 18 01	CC	Okay.
02 03 18 03	CMP	Good morning, Mike. How are you doing?
02 03 18 05	CC	Fine, fine, Jim. You are sounding good this morning. We would like to give you a little rundown on these stars. As you can see in the flight plan, we've got you scheduled for a number 33, Antares, number 34, Atria, and number 40, old Altair. Now, the first of those, Antares, is in plane; the second two are out of plane. As you know, we would like to get a mixture of the in and the out of plane. Antares, number 33, is close to the sun, and we expect that you are going to have difficulty getting those measurements on number 33. We would like very much for you to try, but if you are unable to do number 33, then we propose that you use number 42, which is Peacock, to the lunar far horizon. We realize Peacock isn't the greatest one available - greatest star in the sky - but it's about the only one available. Over.

02 03 19 06	CMP	Roger. Understand. I'll - we will go to Antares first and try it. You know, we tried it last time, but I got one set before I lost the moon completely in the white haze. I'll give it another try, and if it doesn't work out, we will go to Peacock and give it -
02 03 19 26	CC	That - that is affirmative, Jim, and if neither Antares nor Peacock work, well then, we just will be happy to go with Atria and with Altair. We would like them to increase the number of sets and do three on Atria, that is, number 34, and two on Altair, number 40; but that is only in the event that you can get neither Antares nor Peacock.
02 03 20 07	CC	Apollo 8, Houston. Did you copy?
02 03 20 12	CMP	Roger. This is 8. Copied. We'll increase the number 34 to three and the number set of 40 to two if we cannot get 33 or 42.
02 03 20 25	CC	Yes, that's exactly right.
02 03 47 55	CC	Apollo 8, this is Houston. Over.
02 03 47 59	CDR	Go ahead, Houston. Apollo 8.
02 03 48 02	CC	Roger. We're getting low bit rate from you, rather than high, and on this P23 work, for us to get our data, you're going to have to delay the DSKY display about 10 seconds when it comes up with NOUN 987. Over.
02 03 48 18	CDR	Roger.

02 03 48 44	CC	Apollo 8, Houston. We are past that 87 display now. Did you write down what your trunnion bias was?
02 03 48 57	CDR	Negative.
02 03 49 00	CMP	Houston, we haven't started 23 yet. Our CAL is zero.
02 03 49 12	CC	Roger. Understand. Thank you.
02 03 49 17	CMP	We are in the process now to - to go to P23 attitude.
02 03 49 27	CC	Roger. Thank you.
02 03 53 42	CC	Apollo 8, Houston.
02 03 53 47	CDR	Go ahead, Houston. Apollo 8.
02 03 53 49	CC	Roger. Downlink data shows that on star 33, Jim is using the lunar far horizon when he should be using the lunar near horizon. Over.
02 03 54 02	CDR	Okay. Thank you. 220?
02 03 54 07	CC	Roger. 220.
02 03 54 14	CDR	Let us check it.
02 03 54 16	CC	Roger.
02 03 54 58	CDR	You want the far horizon now, Houston?
02 03 55 01	CC	Roger. Far horizon.
02 03 55 06	CMP	We have far horizon in now, Mike, on 220. I will check again, though.
02 03 55 12	CC	Yes. That is right. We are requesting the lunar near horizon as per the flight plan, the lunar near horizon. We show that you are using the lunar far horizon.

02 03 55 27	CMP	Okay. Roger. I thought that you had copied up 220 to me. I will put it in the near horizon.
02 03 55 34	CC	Roger.
02 03 58 50	LMP	Houston, Apollo 8. Over.
02 03 58 52	CC	Apollo 8, Houston. Go ahead.
02 03 59 03	LMP	Mike, it's getting kind of damp - we're getting a playback, Mike. It is getting kind of damp in here. It might be a good idea to go back into AUTO on the temp in - the glycol temp in for awhile to try and get some of this moisture out of the cabin.
02 03 59 21	CC	Roger. Stand by, Bill.
02 03 59 28	LMP	Roger.
02 04 00 08	CC	Apollo 8, Houston.
02 04 00 13	LMP	Go ahead.
02 04 00 14	CC	We concur. We would like you to go back to AUTO on the glycol temp inlet valve. Over.
02 04 00 22	LMP	Okay. When was our lowest radiator OUT TEMP during the last couple of hours while we have been in MANUAL?
02 04 00 28	CC	I will get it for you.
02 04 00 33	LMP	And we are back in AUTO.
02 04 00 35	CC	Roger. Back in AUTO, and 29 degrees is as low as we've seen.
02 04 00 43	LMP	Okay. We are showing a CABIN TEMP of about 76. It is very comfortable, but we are getting a lot of condensation on the walls now.

02 04 00 54	CC	Roger. Understand.
02 04 05 00	CDR	Houston, Apollo 8.
02 04 05 04	CC	Apollo 8, this is Houston.
02 04 05 08	CDR	Roger, Mike. While we are waiting for the spacecraft to maneuver to the moon, I might note that as we get closer to the moon, the light from the sun comes right into the scanning telescope, and it is impossible to use. You have to rely on the sextant alone.
02 04 05 35	CC	Roger, Jim. Understand that light from the sun is coming into the scanning telescope making it impossible to use, and you have to rely on the sextant alone. Can you attach any angle to that?
02 04 05 55	CDR	Well, Mike, I am right now at the substellar point of 33. I don't know where the sun is exactly from there, but that is about the angle. We're - the optics are pointed right at the moon now.
02 04 06 10	CC	Roger. Understand.
02 04 08 47	CC	Apollo 8, Houston. We are going to be changing our antennas in a couple of minutes. You can expect a COMM switch-over.
02 04 08 57	CDR	Thank you.

END OF TAPE

02 04 19 22	LMP	Houston, Apollo 8. Over.
02 04 19 26	CC	Apollo 8, Houston. Go.
02 04 19 30	LMP	Roger. The LMP is going to take a little snooze here for a while. I am wondering, can you give me a quick - your view of the system status here before I depart, and, also, give me an idea of when the next cryo stir is due?
02 04 19 48	CC	Roger, Bill. Will do; stand by.
02 04 20 23	CC	Apollo 8, Houston.
02 04 20 27	LMP	Go ahead.
02 04 20 29	CC	Roger. Your systems remain unchanged. They are all looking good. You can go ahead and stir up the cryo starting right now.
02 04 20 38	LMP	Okay. Will do.
02 04 25 19	CC	Apollo 8, Houston.
02 04 25 23	CDR	Go ahead, Houston.
02 04 25 25	CC	Roger. Before Jim makes his next mark, could he call up VERB 1 NOUN 1? We missed the last trunnion. Over.
02 04 25 36	CDR	Roger. The last trunnion was 10660.
02 04 25 41	CC	10660. Thank you.
02 04 26 53	CC	Apollo 8, Houston.
02 04 26 59	CDR	Go ahead.
02 04 27 00	CC	Roger. Before Bill gets his snooze, we would like him to give us a PRD readout on all three crewmembers. Over.

02 04 27 12	LMP	Roger. CDR is 0.06, CMP is 0.64, and LMP is 0.64.
02 04 27 51	CC	Roger. Thank you, Bill.
02 04 28 00	CDR	Looks like I'm the only one that is radioactive.
02 04 28 02	CC	Understand.
02 04 28 18	CMP	Okay. Houston, we got three sets on 33; we are going now to 34 lunar far horizon for one set. Don't you agree?
02 04 28 26	CC	We agree. Star 34 lunar far horizon for one set.
02 04 29 48	LMP	Houston, the cryos have been stirred, and could you also give me a quick rundown on how the SPS line temps are doing?
02 04 29 58	CC	Roger, Bill. Understand you stirred the cryos. Last time we checked, the SPS line temps were excellent; they were nice and warm. We will give you another number right now.
02 04 30 10	LMP	And a PU valve.
02 04 31 05	CC	Apollo 8, Houston.
02 04 31 10	LMP	Go ahead.
02 04 31 12	CC	Roger. On your SPS system, your oxidizer is running 75 degrees, fuel 74 degrees, and PU valve between 78 and 82 depending on where we measured it. Over.
02 04 31 27	LMP	Real good. Everything really is working fine, isn't it?
02 04 31 30	CC	Yes, it's really humming along, Bill.
02 04 31 37	LMP	Okay. See you later.
02 04 31 39	CC	Adios.

02 04 37 57	CDR	Houston, Apollo 8.
02 04 38 01	CC	Apollo 8, this is Houston.
02 04 38 05	CDR	I understand you want two sets on number 40, lunar near horizon. Is that right?
02 04 38 08	CC	That's affirmative. Two sets on number 40, lunar near horizon.
02 04 42 25	CC	Apollo 8, Houston.
02 04 42 30	CDR	Go ahead, Houston.
02 04 42 32	CC	Roger. We missed your last trunnion angle, Frank.
02 04 42 37	CDR	21450.
02 04 42 41	CC	Roger. 21450, and Paul tells me Valerie is over here and wishes Bill a happy nap.
02 04 42 52	CDR	Okay. Thank you. Tell her that he makes us tired sometimes too, will you?
02 04 43 13	CC	Roger. I will deliver a modified version of the message.
02 04 43 20	CDR	Thank you.
02 04 43 58	CC	Apollo 8, Houston.
02 04 44 04	CDR	Go ahead, Houston.
02 04 44 07	CC	Roger. On star number 40 that you are doing now, the flight plan only calls for one set of marks. You called down two sets, and it's really your choice. Only one is required. We are glad to have the data if you do a second set. Over.
02 04 44 24	CDR	We will only do one then, if you want to. Our flight plan has been updated to include two sets. That is why I called it down.

02 04 44 32	CC	Roger. One set is - will suffice.
02 04 47 28	CC	Apollo 8, Houston. We missed the last trunnion.
02 04 47 34	CDR	Very well, I will read it to you; 21455.
02 04 47 39	CC	21455. Thank you. Just a matter of interest: it is taking your voice about 1.6 seconds to get down to us.
02 04 47 51	CDR	I'm a little hoarse, that's why.
02 04 48 19	CDR	Okay. Houston, do you want us to go back to the PTC attitude now and start the rotisserie again?
02 04 48 25	CC	That is affirmative, Frank. We will have the PTC attitude for you in just a second here.
02 04 48 48	CC	Apollo 8, Houston.
02 04 48 53	CDR	Go ahead.
02 04 48 55	CC	Roger. Those PTC attitudes remain pitch 224 degrees, yaw 020 degrees. On the next page, page 239 of your flight plan, those PTC numbers should be changed to reflect that.
02 04 49 12	CDR	Pitch 224 and yaw 20.
02 04 49 15	CC	That's affirmative.
02 04 52 23	CC	Apollo 8, Houston. Over.
02 04 52 29	CDR	Go ahead, Houston. Apollo 8.
02 04 42 31	CC	When you have a few minutes, we would like to hear the detailed crew status report from you.
02 04 42 40	CDR	Like what?
02 04 42 42	CC	Well, like we would like to know, in the last 24 hours, has anybody had any symptoms similar

to Frank's. We would also like to know - You know, we told you the other day to take Marezine as you like - we would like to know if anybody had taken any drugs, and then we would like to talk over there about sweet breads and water and such.

02 04 53 01 CDR Okay. Nobody has taken any other drugs; nobody took any Marezine; nobody is sick. Bill took one of those pills, a sleep Seconal pill, last night. Everybody had breakfast this morning and ate most of a meal - 1 day 3 - meal a day 3. What else do you want?

02 04 53 31 CC We would like to tell you to drink plenty of water. We think that your water intake may be down. We copied your dosimeter readings. The only other thing is we just were wondering how in general you feel. We show you to have about 15 hours sleep total - Frank or Bill about 10, and Jim about the same, and we were wondering just how you are feeling in general.

02 04 53 58 CDR We all feel fine; we are going to fix it now so that we all have one more rest period before the LOI.

02 04 54 04 CC Roger. Thank you.

02 04 54 11 CMP Happiness is bacon squares for breakfast.

02 04 54 18 CC If you don't eat them all, bring them back, and we'll polish them off here.

02 04 54 34	CDR	Okay, Houston. Apollo 8 here. I stand corrected, William had one Marezine. He didn't tell me about it; he snuck it.
02 04 54 40	CC	Roger. Understand Lovell took the Marezine. Understand.
02 04 54 43	CDR	That's Bill Anders, and he took one when he took the - with the Lomotil, when the doctors told him to.
02 04 54 54	CC	Roger. We copy that. Thank you.
02 04 56 06	CDR	Okay. We are back on the bar-b-que attitude, starting PTC.
02 04 56 10	CC	Roger, Apollo 8. Thank you.
02 04 56 21	CDR	Mike, we ran the latest state vector we have through the P21, and it showed the pericynthian at 69.7 miles.
02 04 56 30	CC	Yes, we were all having big talks about that down here. It looks like you are giving us a real good comparison on our system. Looking - looking extremely good.
02 04 56 45	CDR	We've got the navigator, par excellence.
02 04 56 50	CC	I believe.
02 04 57 28	CC	Apollo 8, Houston.
02 04 57 33	CDR	Go ahead.
02 04 57 36	CC	Roger. What was the time you used on that P21?
02 04 57 42	CDR	6910 there, Mr. Slide Rule.
02 04 57 46	CC	Thank you.
02 04 58 01	CDR	Mike, I wonder if Buz wants us to change the time?

02 04 58 04	CC	No, that is fine.
02 04 58 07	CDR	Oh, okay. Thank you.
02 05 03 07	CDR	Houston, Apollo 8.
02 05 03 11	CC	Apollo 8, Houston.
02 05 03 15	CDR	Roger. Are you going to give us an update for a maneuver PC plus 2 that does not assume a flyby maneuver?
02 05 03 26	CC	Roger. Stand by.
02 05 08 03	CC	Apollo 8, Houston.
02 05 08 12	CMP	Go ahead, Houston. Apollo 8 here.
02 05 08 14	CC	Roger. Here is a rather brief summary of the updates that you will be getting. The one that you have now for PC plus 2 following an LOI minus 8 flyby maneuver is still good. That will not be updated. The next update you will get will be MCC 4. After that, you will get two PC plus 2 maneuvers, that assume MCC 4 completed. One will be a minimum DELTA-V, and the other will be a fast return. Do you copy?
02 05 08 50	CMP	Roger. Understand, and also I take it for MCC 4 you are going to give us a new alignment. Is that correct?
02 05 08 57	CC	That is affirmative.
02 05 26 31	CC	Apollo 8, Houston.
02 05 26 36	CDR	Go ahead, Houston. Apollo 8.

02 05 26 38	CC	Roger, Frank. I've got a lot of talking to do regarding TV cameras and brackets and whatnot. I would like to start in on it whenever you are ready to talk about it.
02 05 26 52	CDR	Let me get a piece of paper out.
02 05 26 54	CC	Okay.
02 05 27 06	CDR	Go ahead.
02 05 27 08	CC	Okay. First a question. Are you planning to show us TV pictures of the earth today?
02 05 27 18	CDR	Well, that is what we wanted to do. It seems that would be the most interesting thing we can show you, but we - you know, we had trouble with the lens.
02 05 27 25	CC	Well, okay, that's good. All this procedure that I am going to give to you here is relative to what we hope are fixes to the lens and for looking out your rendezvous window at the earth, and all the gimbal angles and all that good stuff is based toward looking out the window at the earth rather than at the moon. Over.
02 05 27 49	CDR	Roger.
02 05 27 50	CC	Okay. First, unstow the red filter, the polarizing filter, the red and blue filter holder, and some tape. Over.
02 05 28 07	CDR	Okay. Let me write this down.
02 05 28 09	CC	Roger. I'd suggest that. I've got a whole page full.